

Claims

What is claimed is:

1. An apparatus for regenerating a particulate filter, comprising:
 - a catalyst;
 - a first temperature sensor operable to determine a first temperature corresponding to a temperature of the catalyst and to transmit a first temperature signal as a function thereof;
 - a particulate filter thermally coupled with the catalyst;
 - a hydrocarbon delivery system operable to deliver unburned hydrocarbons to the catalyst as a function of a first control signal;
 - a second temperature sensor operable to determine a second temperature corresponding to a temperature of the particulate filter and to transmit a second temperature signal as a function thereof; and
 - a regeneration controller coupled with the first and second temperature sensors to receive the first and second temperature signals and coupled with the hydrocarbon delivery system, the regeneration controller operable to:
 - determine if the first temperature is above a first threshold temperature;
 - transmit the first control signal to the hydrocarbon delivery system that is operable to cause the hydrocarbon delivery system to deliver substantially no unburned hydrocarbons to the catalyst when the first temperature is below the first threshold.
 - transmit the first control signal to the hydrocarbon delivery system that is operable to cause the hydrocarbon delivery system to deliver unburned hydrocarbons to the catalyst when the first temperature is above the first threshold and the second temperature is below a second threshold;

2. The apparatus of claim 1 wherein first threshold temperature comprises a light-off temperature of the catalyst.

3. The apparatus of claim 1 wherein the second threshold temperature comprises substantially a temperature operable to regenerate the particulate filter.

4. The apparatus of claim 1, wherein the controller is further operable to transmit a control signal to the hydrocarbon delivery system that is operable to reduce the number of hydrocarbons delivered to the catalyst when the first temperature is above the first threshold temperature and the second temperature is above a fourth threshold temperature.

5. The apparatus of claim 4 wherein the fourth threshold temperature comprises a temperature of not more than approximately 625 to 675 degrees Celsius.

6. The apparatus of claim 1 wherein the hydrocarbon delivery system comprises a fuel injector.

7. An apparatus for regenerating a particulate filter, comprising:
a catalyst;
a first temperature sensor operable to determine a first temperature corresponding to a temperature of the catalyst and to transmit a first temperature signal as a function thereof;
a particulate filter thermally coupled with the catalyst;
a hydrocarbon delivery system operable to deliver unburned hydrocarbons to the catalyst as a function of a first control signal;

a second temperature sensor operable to determine a second temperature corresponding to a temperature of the particulate filter and to transmit a second temperature signal as a function thereof; and

a regeneration controller coupled with the first and second temperature sensors to receive the first and second temperature signals and coupled with the hydrocarbon delivery system, the regeneration controller operable to:

determine if the first temperature is above a first threshold temperature;

determine if the second temperature is above a second threshold; transmit a control signal to the hydrocarbon delivery system that is operable to:

cause the hydrocarbon delivery system to deliver substantially no unburned hydrocarbons to the catalyst when the first temperature is below the first threshold temperature;

cause the hydrocarbon delivery system to increase the quantity of unburned hydrocarbons delivered to the catalyst when the first temperature is above the first threshold temperature and the second temperature is below the second threshold;

cause the hydrocarbon delivery system to decrease the quantity of unburned hydrocarbons to the catalyst when the first temperature is above the first threshold temperature and the second temperature is above a third threshold.

8. The apparatus of claim 7 wherein the second threshold temperature comprises a temperature different from the third threshold temperature.

9. The apparatus of claim 7 wherein the second threshold temperature comprises substantially the third threshold temperature.

10. The apparatus of claim 7 wherein the first temperature threshold comprises substantially the light-off temperature of the catalyst.

11. The apparatus of claim 7 wherein the second temperature threshold comprises substantially a temperature operable to regenerate the particulate filter.

12. The apparatus of claim 7 wherein the hydrocarbon delivery system comprises a fuel injector.

13. A method for regenerating a particulate filter, comprising:
determining a first temperature corresponding to a temperature of a catalyst that is thermally coupled with a particulate filter;
determining a second temperature corresponding to the temperature of the particulate filter;
delivering substantially no unburned hydrocarbons to the catalyst when the first temperature is below a first threshold; and
delivering unburned hydrocarbons to the catalyst when the first temperature is above the first threshold and the second temperature is below a second threshold.

14. The method of claim 13 wherein delivering unburned hydrocarbons to the catalyst comprises delivering at least one of a diesel fuel, gasoline, natural gas, kerosene, and crude oil to the catalyst.

15. The method of claim 13 wherein the first threshold temperature comprises a "light-off" temperature for the catalyst.

16. The method of claim 13 wherein the second threshold temperature comprises a temperature operable to regenerate the particulate filter.

17. A method for regenerating a particulate filter, comprising:
determining a first temperature corresponding to a catalyst that is thermally coupled with a particulate filter;
determining a second temperature corresponding to the temperature of the particulate filter;
performing closed loop control of the second temperature when the first temperature is above a first threshold.

18. The method of claim 17 wherein performing closed loop control of the second temperature comprises controlling the second temperature to substantially a predetermined temperature.

19. The method of claim 18 wherein the predetermined temperature comprises a temperature operable to regenerate the particulate filter.

20. The method of claim 17 wherein performing closed loop control of the second temperature comprises controlling the second temperature to substantially a predetermined range of temperatures.

21. The method of claim 20 wherein the predetermined range of temperatures comprises a range of temperatures operable to regenerate the particulate filter.